

What is claimed is:

- 1 1. A method for image tamper detection, comprising the steps
- 2 2 of:
 - 3 (a) computing a thumbnail of an original image;
 - 4 (b) embedding the computed thumbnail in the original image
 - 5 5 to create a marked image;
 - 6 (c) transmitting the marked image to a recipient;
 - 7 (d) extracting the embedded thumbnail from the transmitted
 - 8 8 marked image;
 - 9 (e) computing a new thumbnail of the received image;
 - 10 (f) differencing the extracted thumbnail from the new
 - 11 11 thumbnail to create a difference image that represents the
 - 12 12 similarity of the two thumbnails;
 - 13 (g) alerting if the difference image shows the two thumbnails
 - 14 14 are not sufficiently similar; and
 - 15 (h) authenticating the image if the difference image shows
 - 16 16 the two thumbnails are sufficiently similar.

- 1 2. A method for image tamper detection according to claim 1,
- 2 2 wherein step (b) includes ensuring that the embedding does not
- 3 3 change the size of the original image.

1 3. A method for image tamper detection according to claim 1,
2 wherein step (b) includes ensuring that the embedding does not
3 change the dynamic range of the original image.

1 4. A method for image tamper detection according to claim 1,
2 wherein step (b) further comprises employing a data hiding
3 technique that is resistant to channel noise.

1 5. A method for image tamper detection according to claim 1,
2 wherein step (b) further comprises employing a data hiding
3 technique that is resistant to image compression.

1 6. A method for image tamper detection according to claim 5,
2 wherein the image compression technique is JPEG.

1 7. A method for image tamper detection according to claim 5,
2 wherein step (b) further comprises employing a data hiding
3 technique that is resistant to channel noise.

1 8. A method for image tamper detection according to claim 1,
2 wherein step (b) further comprises employing a data hiding
3 technique based on Spread Spectrum Image Stenography.

1 9. A method for image tamper detection according to claim 1,
2 wherein said thumbnail is defined as a low resolution version of an
3 image.

1 10. A method for image tamper detection according to claim 1,
2 wherein steps (a) and (e) further comprise employing a wavelet
3 decomposition.

1 11. A method for image tamper detection according to claim 1,
2 wherein step (g) further comprises thresholding the difference
3 image to provide automatic detection of tampering.

1 12. An apparatus for image tamper detection that creates and
2 authenticates marked images based on thumbnail processing of that
3 image, said apparatus comprising:

4 (a) a memory having instructions stored therein, said
5 instructions being executable to perform a process of thumbnail
6 computation; and

7 (b) a processor comprising means for executing said
8 instructions, said instruction comprising the operations of:

9 (i) accepting an original image or a marked image;

10 (ii) performing thumbnail processing of the accepted
11 image
12 to:
13 a. derive a thumbnail of the accepted image,
14 b. create a marked image from the accepted original
15 image and said derived thumbnail, and
16 c. authenticate an accepted marked image with
17 said derived thumbnail.

1 13. The apparatus of claim 12, wherein said marked image is
2 created by embedding said derived thumbnail in the accepted image.

1 14. The apparatus of claim 12, wherein said operation
2 (ii) (3) includes extracting an embedded thumbnail from the
3 accepted marked image and comparing said derived thumbnail with
4 said embedded thumbnail for similarity.

1 15. A system for image tamper detection that creates and
2 authenticates marked images based on thumbnail processing of that
3 image, said system comprising:
4 (a) means for computing a thumbnail;
5 (b) means for marking an original image with said thumbnail;
6 and

7 (c) means for authenticating a marked image with said
8 thumbnail.

1 16. A medium that stores instructions for image tamper
2 detection that creates and authenticates marked images based on
3 thumbnail processing of that image, adapted to be executed by at
4 least one processor to perform the steps of:

5 (a) accepting an original or marked image;

6 (b) computing a derived thumbnail from the accepted image;

7 (c) for an accepted original image, embedding the derived
8 thumbnail into the accepted image;

9 (d) for an accepted marked image, extracting an embedded
10 thumbnail from the marked image; and

11 (e) for an accepted marked image, comparing said derived
12 thumbnail with said extracted thumbnail to determine similarity.